

Clinical Practice Guideline Appraisal Using the AGREE Instrument

Renal Screening

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The purpose of this article is to explain how an evidence-based practice team of 7 nurses appraised the National Kidney Foundation Kidney Disease Outcomes Quality Initiative Clinical Practice Guidelines for Chronic Kidney Disease using the Appraisal of Guidelines, Research and Evaluation in Europe (AGREE) instrument. The quality and rigor of clinical practice guidelines (CPGs) vary. The AGREE instrument is a tool that provides a framework to assess the quality of CPGs and determine applicability to practice. By appraising the CPGs using this tool, nurses established best practice for renal screening before angiography. Nursing practice outcomes from the appraisal process include an increased appreciation of the science behind evidence-based treatment recommendations and greater confidence to recommend changes in practice. The AGREE scores substantiated the need to change renal screening to include an index of renal function before cardiac angiography. The AGREE instrument is an effective tool to assess CPG quality. Future research should expand upon translating CPGs into bedside practice.

KEY WORDS: Appraisal of Guidelines Research and Evaluation in Europe (AGREE) appraisal instrument, chronic kidney disease, practice guidelines

Evidence-based practice (EBP) requires nurses to know how to find, appraise, and use best evidence to provide high-quality nursing care.¹ Because of the increasing number of published guidelines, nurses must be able to identify good quality clinical practice guidelines (CPGs) on which to base their practice. Clinical practice guidelines based on systematic reviews of randomized controlled trials are classified as level I evidence—the most rigorous type.¹ In fact, “good guidelines will help us take evidence into practice.”² The significance of CPGs is not to be underestimated; they surpass their usefulness as a tool for managing patients and will ultimately be responsible for improving patient outcomes by

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implementing EBP.³ Health care providers are encouraged to learn and follow evidence-based guidelines to improve patient outcomes.

PURPOSE

The purpose of this article is to explain how an EBP team of 7 nurses appraised the National Kidney Foundation Kidney Disease Outcomes Quality Initiative (NKF KDOQI) Clinical Practice Guidelines for Chronic Kidney Disease⁴ using the Appraisal of Guidelines Research and Evaluation in Europe (AGREE) instrument.⁵ The AGREE instrument provides a framework to assess the quality of CPGs and determine applicability to practice, using an objective method of evaluation. Although other tools such as the Grading of Recommendations, Assessment, Development, and Evaluation⁶ approach offer criteria for rating CPG quality, the AGREE tool is considered the criterion standard.⁷ Reliability for the AGREE tool is acceptable for most domains, with a Cronbach α of .64 to .88.⁸

The AGREE instrument consists of 23 questions and is organized into 6 domains: scope and purpose, stakeholder involvement, rigor of development, clarity and presentation, applicability, and editorial independence. Appraisers rate each question on a 4-point scale ranging from 4 (strongly agree) to 1 (strongly disagree). A score for each domain is calculated. At least 4 appraisers are recommended to reliably assess a guideline using the AGREE instrument.⁹ The domain scores are independently presented and are not used to form a single comprehensive score of quality. Individual domain scores generate discussion of guideline strengths and weaknesses and aid in the decision to accept the guideline for nursing practice.

The AGREE instrument has been previously used in the evaluation of the quality of CPGs: to answer a specific clinical question and to summarize multiple CPGs for practice. For example, a group of physicians, dentists, and oral surgeons used the AGREE principles to determine which CPGs could be used to answer a clinical question related to whether to discontinue antiplatelet and anticoagulation medication before dental surgery.¹⁰ To make recommendations for diabetes care for the American College of Physicians, a group of physicians used the AGREE instrument to evaluate multiple diabetes guidelines.¹⁰ Similarly, a multidisciplinary team used the AGREE principles to develop a workflow tool for patients awaiting liver transplant.¹¹ In summary, the AGREE instrument is a good resource used by clinicians to determine high-quality CPGs upon which to base practice or as an outline for guideline developers.

Case Scenario

An 80-year-old white woman presents to a cardiac diagnostic care unit for cardiac clearance in preparation for a scheduled knee replacement. Her risk factors warrant a cardiac catheterization for evaluation of her coronary arteries, which involves exposure to contrast media via coronary angiography. She is alert and pleasant and lives independently. Her medical history includes diet-controlled diabetes mellitus, hypertension, and osteoarthritis. Medications include valsartan 80 mg PO daily and ibuprofen 200 mg PO when necessary. Her nurse,

Karen, reviews the preprocedure physician orders and draws blood for routine laboratory testing. Laboratory results return within normal limits, including a serum creatinine of 1.5, which falls within the normal limits for this procedure on the current preprinted orders. Despite this “acceptable” serum creatinine level, Karen questions if her patient is at risk for contrast-induced nephropathy (CIN). She wonders, “What is the best screening test for kidney function?”

METHODS

An EBP team consisting of 7 nurses (2 nurse practitioners, 1 clinical nurse specialist, 1 master’s-prepared outcomes manager, and 3 staff nurses) individually appraised the KDOQI guidelines using the AGREE instrument. The goal of our team was to establish best practice for screening of renal function before cardiac angiography to ultimately prevent CIN. Contrast-induced nephropathy is defined as an absolute or relative increase in serum creatinine after exposure to a contrast agent compared with baseline value when other explanations for renal impairment have been excluded.¹² It occurs within 24 to 48 hours of the contrast exposure, with creatinine peaking 3 to 5 days after the procedure and returning to baseline value in 1 to 3 weeks.¹² This EBP team was innovative because this was the first time clinical nurses had used a standardized tool in this practice setting to establish CPG quality by assessing the 6 AGREE domains. Subsequent paragraphs will describe the team’s evaluation of the KDOQI guidelines, organized by domain.

Domain 1: Scope and Purpose

The NKF KDOQI guideline developers sought to develop a classification of the stages of chronic kidney disease (regardless of underlying cause) and an action plan for the evaluation and treatment of chronic kidney disease. Although there were multiple clinical questions addressed in the guideline, the section most relevant to screening for kidney disease was covered in part 5 of the guideline, “Evaluation of Laboratory Measurements for Clinical Assessment of Kidney Disease.” In this section, the guidelines state that estimates of glomerular filtration rate (GFR) provide the best index of kidney function. For adults, the Modification of Diet in Renal Disease (MDRD) and Cockcroft-Gault study equations are the most useful GFR prediction equations. In addition, the guidelines state that serum creatinine alone should not be used to assess kidney function. The target population of the guideline includes those who have or are at an increased risk of developing chronic kidney disease, which would be applicable to patients undergoing cardiac catheterization.

Domain 2: Stakeholder Involvement

An interdisciplinary group formulated the KDOQI guidelines, including individuals with expertise in nephrology, epidemiology, laboratory medicine, nutrition, social work, pathology, gerontology, and family medicine. The AGREE instrument evaluates consideration of the patients’ views and preferences in the development of the guideline. The KDOQI guidelines focus on improvement of chronic kidney disease; although

the guidelines do not specifically discuss the consideration of the patient's views and preferences, the guidelines were ultimately developed with improved patient outcomes in mind. The target users of the guideline were identified as patients and families, health care professionals caring for these patients, instrument manufacturers, diagnostic laboratories performing measurements of kidney function, agencies and institutions that provide or pay for health care, and investigators studying chronic kidney disease. The guidelines did not clearly describe pilot testing of the information prior to publication.

Domain 3: Rigor of Development

The NKF KDOQI guideline developers used systematic methods to search for evidence, and the criteria for selecting the evidence were clearly described. Studies were identified through MEDLINE searches of English-language literature with detailed search strategies from 1966 through 2000. The text words or MeSH (Medical Subject Headings) included kidney or kidney diseases or kidney function tests, and MEDLINE search results were screened. Potential articles for retrieval were identified from printed abstracts and titles, based on study population, relevance to topic, and article type. In general, studies with fewer than 10 subjects were not included. Each article was screened to verify relevance and appropriateness for review, based primarily on study design and ascertainment of necessary variables. A goal was set of approximately 30 articles per topic. Domain experts made the final decision for inclusion or exclusion of articles. All articles included were abstracted and contained in the evidence tables. Relevant articles known to the domain experts and reviewers supplemented searches, and the search process included input from all members of the guideline development work group.

The methods used for formulating the recommendations were clearly described. Each rationale statement was graded according to the level of evidence on which it was based, so a clear link between the recommendations and the supporting evidence was evident. The health benefits of kidney screening were considered in formulating the recommendations. Because the guidelines did not contain treatment information, adverse effects and risks of treatment were not addressed. Adverse outcomes of kidney disease were based on the level of kidney function and risk of loss of function in the future. Chronic kidney disease tends to worsen over time, and therefore, the risk of adverse outcomes increases over time with disease severity. The health benefits of early diagnosis and treatment, along with treating comorbid conditions, may slow the progression of kidney disease. By screening patients undergoing contrast media exposure prior to cardiac catheterization, adverse patient outcomes may be preventable.

The format used for summarizing the strength of evidence made the recommendations and the supporting evidence easy to identify. Study strength was based on 4 dimensions: study size, applicability, results, and methodological quality. Evidence tables were created. Within each table, studies were ordered first by methodological quality (best to worst), then by applicability (most to least), and then by study size (largest to smallest).

External reviewers reviewed the draft guidelines, and suggestions for change were incorporated into the final report. As a result, the guidelines reflected the work group, evidence review team, and the NKF perspectives. A procedure for updating the guideline was discussed.

Domain 4: Clarity and Presentation

The recommendations for practice were specific and unambiguous. The guidelines were structured according to the 4 goals of the working group. The key points/recommendations were listed in bulleted format below a 1-paragraph summary in each guideline statement. Management of chronic kidney disease was not addressed. Clinical performance measures were provided in a table, which could be used as tools for application to practice.

Domain 5: Applicability

The potential organizational barriers in applying the recommendations for practice were indirectly discussed in the guideline. Lack of a hospital nephrologist could be an organizational barrier. Challenges related to coordination of care across the outpatient and inpatient settings could exist. A quick laboratory turnaround time would be necessary for outpatients undergoing cardiac catheterization. Staff resources to calculate an estimate of GFR would be required. The increased health care costs following implementation of a screening program for all patients could also be a barrier.

In the past, universal screening for kidney disease was not recommended because of the low prevalence of chronic kidney disease and the lack of treatments to improve outcomes. However, the guidelines suggest that the prevalence of earlier stages of chronic kidney disease is higher than previously known and that earlier detection and treatment are important to prevent or delay the loss of kidney function and development of cardiovascular disease. This supports the value of universal screening for all patients at increased risk for kidney disease undergoing contrast media exposure.

Part 8 of the guidelines contain recommendations for clinical performance measures for various subjects such as evaluation and treatment of chronic kidney disease, but these criteria were in draft format at the time of publication.

Domain 6: Editorial Independence

The NKF, as well as the work group, recognized the support of Amgen (Thousand Oaks, California). It is difficult to assess if the guideline was editorially independent from the funding body. There were many organizations and businesses that took part in the guideline review process, some of which may have had indirect financial interest. All work group members completed a disclosure statement certifying that any potential conflict of interest would not influence their judgment or actions concerning the KDOQI.

RESULTS

The NKF KDOQI Clinical Practice Guidelines for Chronic Kidney Disease were appraised using the AGREE appraisal instrument. Domain scores are listed in the Table. Domain 2, Stakeholder Involvement, was rated 52.4 (max score, 100) because patients' views and preferences were not included during guideline development, and pilot testing was not discussed. Domain 5, Applicability, was rated 49.2 because specific organizational barriers for implementation were not clearly discussed, along with clear review criteria for monitoring

Table. Mean Guideline Scores Across Domains of the Appraisal of Guidelines, Research and Evaluation in Europe (AGREE) Instrument^a for National Kidney Foundation Kidney Disease Outcomes Quality Initiative Clinical Practice Guidelines for Chronic Kidney Disease

AGREE Domains	Scores
Domain 1—scope and purpose	
1. The overall objective(s) of the guideline is (are) specifically described.	4.0
2. The clinical question(s) covered by the guideline is (are) specifically described.	3.9
3. The patients to whom the guideline is meant to apply are specifically described.	4.0
Standardized domain 1 score (scale, 0–100)	98.0
Domain 2—stakeholder Involvement	
4. The guideline development group includes individuals from all relevant professional groups.	3.7
5. The patients' views and preferences have been sought.	1.0
6. The target users of the guideline are clearly defined.	3.9
7. The guideline has been piloted among target users.	1.7
Standardized domain 2 score (scale, 0–100)	52.4
Domain 3—rigor of development	
8. Systematic methods were used to search for evidence.	3.9
9. The criteria for selecting the evidence are clearly described.	4.0
10. The methods used for formulating the recommendations are clearly described.	3.9
11. The health benefits, adverse effects, and risks have been considered in formulating the recommendations.	3.9
12. There is an explicit link between the recommendations and the supporting evidence.	3.7
13. The guideline has been externally reviewed by experts prior to its publication.	3.9
14. A procedure for updating the guideline is provided.	1.4
Standardized domain 3 score (scale, 0–100)	87.0
Domain 4—clarity and presentation	
15. The recommendations are specific and unambiguous.	3.9
16. The different options for management of the condition are clearly presented.	3.9
17. Key recommendations are easily identifiable.	3.7
18. The guideline is supported with tools for application.	3.1
Standardized domain 4 score (scale, 0–100)	88.1
Domain 5—applicability	
19. The potential organizational barriers in applying the recommendations have been discussed.	1.3
20. The potential cost implications of applying the recommendations have been considered.	2.6
21. The guideline presents key review criteria for monitoring and/or audit purposes.	3.6
Standardized domain 5 score (scale, 0–100)	49.2
Domain 6—editorial independence	
22. The guideline is editorially independent from the funding body.	1.7
23. Conflicts of interest of guideline development members have been recorded.	3.6
Standardized domain 6 score (scale, 0–100)	54.8

^aEach item is rated on a 4-point scale ranging from 4 (strongly agree) to 1 (strongly disagree), with 2 mid points: 3 (agree) and 2 (disagree). The scale measures the extent to which a criterion (item) has been fulfilled.

compliance with the guideline recommendations. For example, documentation of screening for renal disease using the MDRD or Cockcroft-Gault (instead of using serum creatinine alone) should be recorded, which would demonstrate compliance with the KDOQI guideline recommendations. Domain 6, Editorial Independence, was rated 54.8 because the evaluators (our appraisal team) were not able to determine if the guidelines were editorially independent from funding bodies.

The AGREE appraisal instrument objectively identified the strengths of the KDOQI Clinical Practice Guidelines for Chronic Kidney Disease. Domain 1, Scope and Purpose, was

appraised a near-perfect 98.0 by the EBP team. Domain 4, Clarity and Presentation, was also highly rated at 88.1. The EBP team also appraised domain 3, Rigor of Development, high at 87.0 because of the clear literature search methods, link between evidence and recommendations for practice, and external review prior to publication.

DISCUSSION

The developers of the AGREE instrument state that each domain must remain independent and may not be used to form

a comprehensive score of quality. The EBP team appraised 3 domains favorably and 3 domains unfavorably. Krainovich-Miller et al⁷ state, "...After the critical appraisal is conducted on an EBP guideline, and a determination is made as to the strength and quality of the evidence provided by the guideline or sections of the guidelines, the results must be considered in the context of the complete EBP lens (ie, clinician's experience, patient preference, and available resources)." The AGREE instrument helped the team identify deficits within the NKF KDOQI Clinical Practice Guidelines for Chronic Kidney Disease. Insufficiencies were lack of patient perspective, omission of organizational barriers for implementation, lack of clear review criteria for monitoring purposes, and omission of conflict-of-interest statements from key reviewers. The guidelines were judged appropriate for practice after assessed within the context of the complete EBP lens and clinical scenario. The AGREE instrument provided the necessary questions to assess CPG rigor and helped the team decide to adopt a portion of the guideline for nursing practice.

Resolution of the Clinical Scenario

In the case scenario described, the bedside nurse was able to find an answer to her clinical question and determine best practice for renal function screening. The patient's risk factors for CIN were diabetes mellitus, advanced age (>65 years old), and nephrotoxic drugs (angiotensin receptor blocker and non-steroidal anti-inflammatory drugs). According to the NKF KDOQI Clinical Practice Guidelines for Chronic Kidney Disease, this patient should be screened for renal disease using the MDRD or Cockcroft-Gault equations instead of using serum creatinine alone. By using the MDRD equation, Karen found that her patient's estimated GFR is only 35.5. Although the preprinted orders state that a serum creatinine of 1.5 is acceptable, Karen determined that the estimated GFR of 35.5 places her patient at risk for CIN; she notified the physician of her findings. Appraisal using the AGREE instrument enabled the team to effectively evaluate the NKF guidelines. After this assessment was completed, the team decided that a change in practice was evident. A multidisciplinary team is in the process of revising the current preprinted order set to reflect this evidence-based change in standard of care.

CONCLUSIONS

Appraising CPGs using the AGREE appraisal instrument was a time-consuming yet beneficial process. Nursing practice outcomes from the appraisal process include an increased appreciation of EBP and the science behind evidence-based guideline recommendations. The results from the AGREE appraisal supported the nurses' decision to recommend a change in current practice, adding an index of renal function during universal outpatient renal screening. Future potential patient/client outcomes could include a reduction in the incidence of CIN and earlier identification of those who should be pretreated prior to angiography. Because the incidence of CIN ranges from 1% to 14% of the general population, many patients may benefit from renal screening.¹³ System-level outcomes include cost savings by preventing negative sequelae associated with CIN such as advanced chronic kidney disease and dialysis, increased hospital length of stay, and increased morbidity/mortality. If the nationally accepted CPGs are implemented,

health care systems (ie, hospitals) would likely benefit from decreased liability by adhering to best practice recommendations.

Implications for Practice

The AGREE appraisal instrument provides the questions needed to accurately assess CPG quality. By using this instrument, nurses can confidently recommend changes in practice. Greenhalgh¹⁴ identifies barriers that cause clinicians to resist CPGs—the debate about the quality of evidence included in CPGs and lack of appreciation of evidence by practitioners (whose practice is based on tradition). This innovative EBP team was able to break down both of these barriers by using and applying the AGREE instrument in their literature review.

The evaluation of the NKF KDOQI guidelines using the AGREE instrument was the initial step taken in the literature review completed by this hospital-based EBP team. A thorough literature review has since taken place, and the team is currently in the process of developing a research proposal focusing on this topic. The information taken from the guidelines has been presented to the nursing staff, and more patients are being identified at risk for kidney damage based on their risk factors. Future work will measure the impact and outcomes of universal renal screening prior to angiography.

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